

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

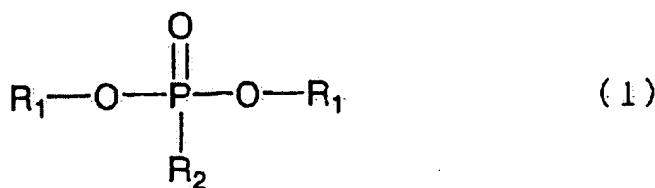
LISTING OF CLAIMS:

1. (original): A phosphorus-containing urethane (meth)acrylate compound obtained by reacting (A) a polyol compound comprising (A1) a phosphorus-containing polyol having a phosphorus atom, with (B) a bifunctional or greater polyisocyanate and (C) a hydroxyl group-containing (meth)acrylate.

2. (original): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that the polyol compound (A) is the phosphorus-containing polyol having a phosphorus atom (A1).

3. (original): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that the polyol compound (A) consists of (A1) the phosphorus-containing polyol with a phosphorus atom and (A2) a phosphorus-free polyol without a phosphorus atom.

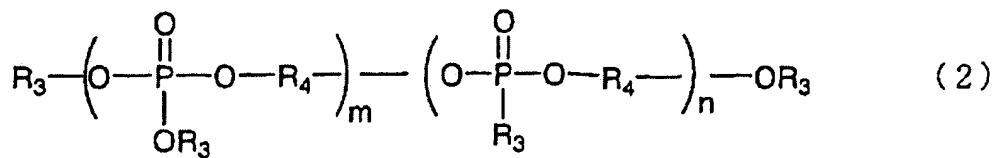
4. (currently amended): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that at least one phosphorus-containing polyol (A1) is a phosphoric polyol represented by the following general formula (1) or (2):



PRELIMINARY AMENDMENT
U.S. Application No. 10/501,864

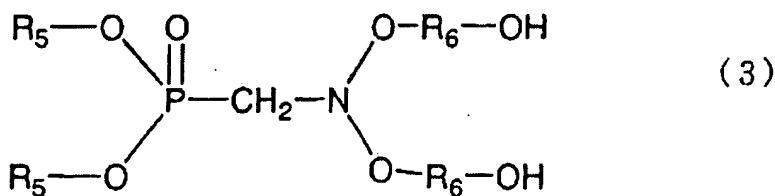
Attorney Docket No. Q68216

where each R₁ is independently hydrogen, C₁₋₁₈ alkyl or C₆₋₂₀ aryl, and R₂ is a group selected from the group consisting of polyhydroxyalkyl, polyhydroxyaryl, polyhydroxyalkylaminoalkyl, polyhydroxyarylaminoalkyl, polyhydroxyalkylaminoaryl and polyhydroxyarylaminoaryl[[.]];



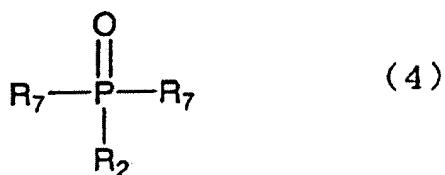
where each R_3 is independently a group selected from the group consisting of C_{1-18} alkyl, C_{6-20} aryl, poly(alkyleneoxide) polyhydroxyalkyl, polyhydroxyaryl, polyhydroxyalkylaminoalkyl, polyhydroxyarylaminoalkyl, polyhydroxyalkylaminoaryl and polyhydroxyarylaminoaryl, with the proviso that at least one R_3 contains a polyhydroxy group; each R_4 is independently a group selected from the group consisting of C_{1-18} alkylene and C_{6-20} arylene; and m and n are each independently an integer of 0-1000, provided that at least one of m and n is 1 or greater.

5. (currently amended): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that at least one phosphorus-containing polyol (A1) is an aminophosphonate polyol represented by the following general formula (3)[[.]]:



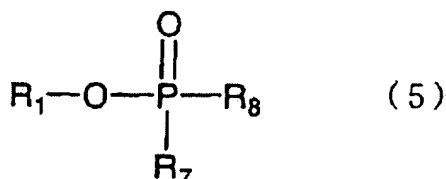
where each R_5 independently represents C_{1-18} alkyl or C_{6-20} aryl, alkylaryl or arylalkyl, which groups may have ether bonds or ester bonds and may contain hydroxyl groups; and each R_6 independently represents C_{1-18} alkylene, which groups may have ether bonds or ester bonds and may contain hydroxyl groups.

6. (currently amended): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that at least one phosphorus-containing polyol (A1) is a phosphine compound represented by the following general formula (4)[[.]]:



where R_2 is a group selected from the group consisting of polyhydroxyalkyl, polyhydroxyaryl, polyhydroxyalkylaminoalkyl, polyhydroxyarylaminolalkyl, polyhydroxyalkylaminoaryl and polyhydroxyarylaminolaryl, and each R_7 is independently C_{1-18} alkyl or C_{6-20} aryl.

7. (currently amended): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that at least one phosphorus-containing polyol (A1) is a phosphinic acid compound represented by the following general formula (5)[[.]]:



where R₁ is hydrogen, C₁₋₁₈ alkyl or C₆₋₂₀ aryl, R₇ is C₁₋₁₈ alkyl or C₆₋₂₀ aryl, and R₈ is a group selected from the group consisting of polyhydroxyalkyl, polyhydroxyaryl, polyhydroxyalkylaminoalkyl, polyhydroxyaryl aminoalkyl, polyhydroxyalkylaminoaryl, polyhydroxyaryl aminoaryl, polyhydroxyalkyloxycarbonylalkyl, polyhydroxyalkyloxycarbonylaryl, polyhydroxyaryl oxycarbonylalkyl and polyhydroxyaryl oxycarbonylaryl.

8. (currently amended): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that the proportion of the phosphorus-containing polyol (A1) in the polyol compound (A) which comprises the phosphorus-containing polyol (A1) and ~~the a~~ phosphorus-free polyol (A2), is 30-100 wt% with respect to the total of the polyol compound (A).

9. (original): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that the phosphorus content of the phosphorus-containing polyol (A1) is 5 wt% or greater.

10. (original): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that the polyol compound (A) includes a carboxyl group-containing polyol having one or more carboxyl groups and two or more alcoholic hydroxyl groups.

11. (original): The phosphorus-containing urethane (meth)acrylate compound according to claim 10, characterized in that the carboxyl group-containing polyol is at least one branched or linear dihydroxyalkanoic polycarboxylic acid selected from the group consisting of dimethylolpropionic acid and dimethylolbutanoic acid.

12. (original): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that the polyol compound (A) includes at least one selected from the group consisting of polyether polyols, polyester polyols, polylactone-based polyols and polycarbonate polyols.

13. (original): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that the polyol compound (A) contains a C₂₋₁₀ glycol.

14. (original): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that the bifunctional or greater polyisocyanate (B) is at least one selected from the group consisting of 2,4-toluene diisocyanate, 2,6-toluene diisocyanate, isophorone diisocyanate, hexamethylene diisocyanate, diphenylmethylen diisocyanate, (o, m or p)-xylene diisocyanate, methylenebis (cyclohexyl isocyanate), trimethylhexamethylene diisocyanate, cyclohexane-1,3-dimethylene diisocyanate, cyclohexane-1,4-dimethylene diisocyanate and 1,5-naphthalene diisocyanate.

15. (original): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that the hydroxyl group-containing (meth)acrylate (C) is at least one selected from the group consisting of 2-hydroxyethyl (meth)acrylate, hydroxypropyl (meth)acrylate, hydroxybutyl (meth)acrylate, caprolactone or alkylene oxide adducts of any of the above acrylates, glycerin mono(meth)acrylate, glycerin di(meth)acrylate, glycidyl methacrylate-acrylic acid adduct, trimethylolpropane mono(meth)acrylate, trimethylol di(meth)acrylate, pentaerythritol tri(meth)acrylate, dipentaerythritol penta(meth)acrylate,

ditrimethylolpropane tri(meth)acrylate and trimethylolpropane-alkylene oxide adduct-di(meth)acrylate.

16. (original): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that the acid value of the solid portion is 5-150 mgKOH/g.

17. (original): The phosphorus-containing urethane (meth)acrylate compound according to claim 1, characterized in that the weight-average molecular weight is 1,000-40,000.

18. (currently amended): A process for ~~producing~~ producing a phosphorus-containing urethane (meth)acrylate compound characterized by comprising polyaddition reaction of (A) a polyol compound comprising (A1) a phosphorus-containing polyol with (B) a bifunctional or greater polyisocyanate to form a urethane oligomer with isocyanate groups at both ends; and addition polymerization of (C) a hydroxyl group-containing (meth)acrylate to said urethane oligomer.

19. (original): The process for production of a phosphorus-containing urethane (meth)acrylate compound according to claim 18, characterized in that the polyol compound (A) includes a carboxyl group-containing polyol having one or more carboxyl groups and two or more alcoholic hydroxyl groups.

20. (original): The process for production of a phosphorus-containing urethane (meth)acrylate compound according to claim 18, characterized in that the polyol compound (A) includes at least one selected from the group consisting of polyether polyols, polyester polyols, polylactone-based polyols and polycarbonate polyols.

21. (original): A photosensitive composition comprising the phosphorus-containing urethane (meth)acrylate compound according to any one of claims 1 to 17.

22. (original): The photosensitive composition according to claim 21, characterized by comprising a phosphorus-free urethane (meth)acrylate compound obtained by reacting (A2) a phosphorus-free polyol having no phosphorus atoms, (B) a bifunctional or greater polyisocyanate and (C) a hydroxyl group-containing (meth)acrylate.

23. (original): The photosensitive composition according to claim 21, characterized by comprising a photopolymerizing monomer and/or a photopolymerizing oligomer.

24. (original): The photosensitive composition according to claim 21 which contains a photopolymerization initiator in a range of 0.2-20 parts by weight to 100 parts by weight of the photocuring component.

25. (original): The photosensitive composition according to claim 21, characterized by containing a thermosetting resin in a range of 5-40 wt% of the total photosensitive composition.

26. (original): The photosensitive composition according to claim 21, characterized in that the proportion of the phosphorus-free urethane (meth)acrylate compound is in a range of 0-70 wt% with respect to the total of the urethane (meth)acrylate compound.

27. (original): The photosensitive composition according to claim 21, characterized in that the amount of the phosphorus-containing urethane (meth)acrylate compound is in a range of 10-90 wt% of the total photosensitive composition.

28. (original): A cured photosensitive composition according to claim 21.

29. (canceled).

30. (currently amended): A coverlay film for a printed wiring board employing ~~the a~~ composition comprising a phosphorus-containing urethane (meth)acrylate compound according to any one of claims 1 to 17.

31. (currently amended): A solder resist for a printed wiring board employing ~~the a~~ composition comprising a phosphorus-containing urethane (meth)acrylate compound according to any one of claims 1 to 17.